National Institute of Environmental Health Sciences

Foods and dietary patterns that are healthy, low-cost, and environmentally sustainable: A case study of optimization modeling for New Zealand

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Year: 2013
Journal: PLoS One. 8 (3): e59648

Abstract:

OBJECTIVE: Global health challenges include non-communicable disease burdens, ensuring food security in the context of rising food prices, and environmental constraints around food production, e.g., greenhouse gas [GHG] emissions. We therefore aimed to consider optimized solutions to the mix of food items in daily diets for a developed country population: New Zealand (NZ). METHODS: We conducted scenario development and linear programming to model 16 diets (some with uncertainty). Data inputs included nutrients in foods, food prices, food wastage and food-specific GHG emissions. FINDINGS: This study identified daily dietary patterns that met key nutrient requirements for as little as a median of NZ$ 3.17 per day (US$ 2.41/d) (95% simulation interval [SI] Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) NZ$ 2.86 to 3.50/d). Diets that included "more familiar meals" for New Zealanders, increased the cost. The optimized diets also had low GHG emission profiles compared with the estimate for the 'typical NZ diet' e.g., 1.62 kg CO2e/d for one scenario (95%SI Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 1.39 to 1.85 kg CO2e) compared with 10.1 kg CO2e/d, respectively. All of the optimized low-cost and low-GHG dietary patterns had likely health advantages over the current NZ dietary pattern, i.e., lower cardiovascular disease and cancer risk. CONCLUSIONS: We identified optimal foods and dietary patterns that would lower the risk of non-communicable diseases at low cost and with low greenhouse gas emission profiles. These results could help guide central and local government decisions around which foods to focus policies on. That is which foods are most suitable for: food taxes (additions and exemptions); healthy food vouchers and subsidies; and for increased use by public institutions involved in food preparation.

Source: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3609827

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Unspecified Exposure

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Co-Benefit/Co–Harm (Adaption/Mitigation):

specification of beneficial or harmful impacts to health resulting from efforts to reduce or cope with greenhouse gases

A focus of content

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation:

mitigation or adaptation strategy is a focus of resource

Mitigation

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified